

motions of the moon and planets presented about a century ago ; and unless considerable exertions be made, it may so continue for many years to come. The tables of the planets have acquired their present accuracy only through the liberal encouragement of learned bodies, and of some of the governments of Europe ; nor can tables of the tides, adapted to the present state of science, be now constructed, unless very considerable expense be incurred, and immense labour bestowed.

The results of numerous observations on the influence of the wind on the tides in the River Thames, are stated ; and the author observes, that this is a subject of considerable importance as regards the accuracy of which tide predictions are susceptible.

The reading of a paper, entitled, “ An Account of some Operations executed at Cape Frio, by the Officers and Crew of His Majesty’s Ship *Algerine*, for the purpose of raising a part of the Stores, &c. lost in His Majesty’s Ship *Thetis*.” By the Hon. Commander F. T. de Roos, R.N., F.R.S.—was commenced.

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February 27, 1834.

FRANCIS BAILY, Esq., Vice-President, in the Chair.

The Hon. Commander de Roos’s paper was resumed and concluded.

The author, who had the command of His Majesty’s ship *Algerine*, was instructed to take charge of the enterprise commenced by the officers and crew of His Majesty’s ship *Lightning*, having for its object the recovery of the treasure and stores from the wreck of the *Thetis*, which, in the month of December 1830, had sunk in a cove to the south-east of Cape Frio. He reached this spot on the 6th of March, 1832, having with him eleven officers and eighty-five men. A certain number of men were appointed to remain on board the ship, which was moored in a harbour two miles off ; a party of artificers and others were employed at the huts which they inhabited near the Cape ; and the rest, nearly thirty-five in number, were stationed at the wreck.

The author gives a description of Cape Frio, and of the island of which it forms the south-eastern extremity, and which is an immense promontory of insulated granite jutting into the Atlantic Ocean, sixty miles east of Rio de Janeiro. The cove, in the middle of which the wreck of the *Thetis* lay, is a square indenture in the cliffs, six hundred feet deep by as many wide. It is surrounded by nearly perpendicular masses of granite, from one hundred to two hundred feet high, and is exposed to the whole swell of the South Atlantic, which sets in with remarkable force in that direction. The weather is singularly variable ; and transitions frequently take place in the course of a few hours, from perfect stillness to the most tremendous swell. The author states that he has witnessed few scenes in nature more sublime than that presented by the *Thetis* Cove during a gale of wind from the south-west.

The author enters into a minute description of the mechanical apparatus employed for obtaining the necessary purchases for the various operations which were required, and gives a circumstantial history of his proceedings. Frequent interruptions were experienced from the state of the weather, and the almost incessant agitation of the water, which was often so powerful as to render the diving-bell unmanageable, and to expose the divers to serious danger. The diving-bell consisted of a one-ton ship's water-tank, with eight inches of iron riveted to the bottom in order to give it more depth, and having attached to it 18 pigs of ballast, the weight of which (17 cwt.) was found to be sufficient to sink it.

As soon as the necessary arrangements had been completed, the author states that he made a minute survey of the bottom, by means of the diving-bell, and ascertained the exact position and shape of all the large rocks which covered the spot where the treasures and stores of the *Thetis* had been scattered. The shape of the area where the precious metals in particular had been deposited, was an ellipse, of which the two principal axes measured 48 and 31 feet; and large boulders of granite had been subsequently rolled over these treasures, and required being removed before the latter could be recovered. The superincumbent pressure of the sea, aided by the huge materials of the wreck of the frigate, which, under the influence of the swell, acting like a paviour's hammer, with enormous momentum, had jammed together the rocks, and produced a strong cohesion between the fragments of wood, and the gold, silver and iron.

The first object was to clear away every portion of the wreck; and after this had been accomplished, to loosen and remove all the large rocks in succession, beginning with the smallest, and ending with the largest and most unwieldy. Some of these, which they succeeded in rolling from their situations into deeper water, weighed about thirty or forty tons; and the largest, which required the greatest efforts to move from its place, was computed to weigh sixty-three tons. This last effort served to show, that no part, either of the wreck or the stores, which was of any value, remained behind; and after fifteen-sixteenths of the property had been recovered, the enterprise, which had so perfectly succeeded, terminated on the 24th of July, and the *Algerine* returned to Rio de Janeiro on the 1st of August.

The author subjoins an account of the currents off Cape Frio, and a description of the climate, which seems to have been favourable, for his party suffered but little from sickness, and the expedition was unattended with the loss of a single life. On one occasion the party were visited by a whale, which approached very near the diving-bell, but fortunately changed its course, without doing any mischief.

A paper was then read, entitled, "An Account of a Concave Achromatic Lens, adapted to the Wired Micrometer, which has been named *Macro-micro*, from its power to increase the primary image of a Telescope without increasing the diameter of the wires in the Micrometer." By George Dollond, Esq., F.R.S.